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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/694,145	10/27/2003	Barbara Horn	200314366-1	3276
22879	7590	07/19/2006	EXAMINER	
HEWLETT PACKARD COMPANY P O BOX 272400, 3404 E. HARMONY ROAD INTELLECTUAL PROPERTY ADMINISTRATION FORT COLLINS, CO 80527-2400			VO, ANH T N	
			ART UNIT	PAPER NUMBER
			2861	

DATE MAILED: 07/19/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/694,145

Applicant(s)

HORN ET AL.

Examiner

Anh T.N. Vo

Art Unit

2861

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 22 May 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 6 and 34-38 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 6 and 34-38 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **FINAL REJECTION**

The rejection under 35 USC 112, second paragraph, is withdrawn in view of the amendments to the claims and the arguments presented in the amendment.

### ***Claim Rejections***

#### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 6 is rejected under 35 USC103 (a) as being unpatentable over Boyle et al (Pub No. US 2002/0170891, S/N=10/102,703) in view of Magges et al (US Pat. 3,867,217).

As the best construed, Boyle et al disclose in Figures A-B and 1-2 a device comprising:

- a substrate (Si) having a feature (slot) formed by a first process (first step) that removes substrate material from the substrate, the feature extending into the substrate and within the substrate along an axis, where a cross-section of the feature taken transverse the axis has an upper terminus (top) proximate a first substrate surface, the upper terminus having a first profile; and
- wherein the upper terminus is formed to have a second profile different from the first profile by a second different process (cleaning step) that removes additional substrate material (damage zone and debris in Figure A) from the substrate.

However, Boyles et al does not disclose that the removing debris is removed by a fluid stream containing abrasive particles.

Maggers et al suggests in Figures 1-3 a substrate comprising a gap (17) which is cleaned by a fluid stream of abrasive particles from a cleaning nozzle (30) for giving dependable cleaning without contaminating the substrate, see lines 42-47, column 1.

It would have been obvious to a person having skill in the art at the time the invention was made to employ the cleaning process as suggested by Maggs et al to remove debris of Boyles for the purpose of giving dependable cleaning without contaminating the substrate.

Claims 34-38 are rejected under 35 USC 103 (a) as being unpatentable over Hall et al (US 6,902,867) in view of Boyle et al (US2002/0170891, S/N=10/102,703) and further in view of Maggs et al (US Pat. 3,867,217).

Hall et al discloses in Figures 2 and 5-27 a printhead comprising:

- a substrate (32, Figure 2) comprising at least a first substrate surface and a second substrate surface;
- a fluid-handling slot (14) formed by at least two substrate removal processes (column 7, lines 50-62) performed on the first substrate surface and the second substrate surface; and
- an orifice layer (36) positioned over the first substrate surface, the orifice layer having multiple firing nozzles (40) formed therein, at least some of the nozzles being in fluid flowing relation with the fluid-handling slot (14 (Figure 2)).

However, Hall does not disclose that at least one of the first substrate surface and the second substrate surface being mechanically conditioned by at least one of the removal processes prior to the orifice layer (36) being positioned over the first substrate surface, at least in part, to reduce an incidence of debris occluding ink flow through individual nozzles, and

wherein the first substrate removal process comprises using a laser and the second substrate removal process comprises using abrasive particles.

Boyle et al in view of Maggs et al suggests in Figures A-B and 1-2 using a laser (11, 12) to form a slot on a substrate (Si) and clean debris on the surface of the substrate (Figure A) by using a fluid stream containing abrasive particles for minimizing thermal damage and to achieve desired effects such as a particular via geometry, see the Abstract of Boyles et al.

It would have been obvious to a person having skill in the art at the time the invention as made to use the laser as suggested by Boyle et al in the printhead of Hall et al to form the slot and remove the debris for the purpose of minimizing thermal damage and to achieve desired effects such as a particular via geometry.

Noted that the slot (14) of Hall et al is formed by using two step processes to remove unused material from the substrate. However, a skilled artisan realizes that the number of removal processes are determined by the thickness and the material of the substrate or the size and shape of the slot so that it can provide a perfect slot. Thus, employing an optimum three different substrate removal processes as claimed is considered to be a matter of a mechanical design expedient for an engineer. Lacking of showing any criticality, one skilled in the art would be motivated to employ the optimum three step processes to form the slot of Hall et al for the purpose of accommodating with thickness and material of a predetermined substrate.

Claims 6 and 34-38 are rejected under 35 USC 103(a) as being unpatentable over Baughman et al. (US Pat. 5,608,436) in view of Boyle et al (US2002/0170891, S/N=10/102,703) and further in view of Maggs et al (US Pat. 3,867,217).

Baughman et al. disclose in Figures 4A-6D an ink jet print head comprising:

- a substrate (12) comprising at least a first substrate surface (12a) and a second substrate surface (12b), a fluid-handling slot (18) formed by at least two substrate removal processes and

extending through the substrate (12) between the first substrate surface and the second substrate surface;

- an orifice layer (22) positioned over the first substrate surface, the orifice layer having multiple firing nozzles (20) formed therein, at least some of the nozzles being in fluid flowing relation with the fluid-handling slot (18);

wherein the fluid-handling slot (18) is formed utilizing three different substrate removal processes; and

- wherein the fluid-handling slot (18) is formed utilizing at least one substrate removal process directed at the first substrate surface to remove a first portion (18'). Laser ablation can be used to remove the unwanted material portion (18'), see lines 45-58, column 6. A second substrate removal process directed at the second substrate surface to remove a second portion (18a) (column 6, lines 2-10).

However, Baughman et al does not disclose that at least one of the first substrate surface and the second substrate surface being mechanically conditioned by at least one of the removal processes prior to the orifice layer (22) being positioned over the first substrate surface, at least in part, to reduce an incidence of debris occluding ink flow through individual nozzles, and wherein the first substrate removal process comprises using a laser and the second substrate removal process comprises using abrasive particles.

Boyle et al in view of Maggs et al suggests in Figures A-B and 1-2 using a laser (11, 12) to form a slot on a substrate (Si) and clean debris on the surface of the substrate (Figure A) by using a fluid stream containing abrasive particles for minimizing thermal damage and to achieve desired effects such as a particular via geometry, see the Abstract of Boyles et al.

It would have been obvious to a person having skill in the art at the time the invention was made to use the laser as suggested by Boyle et al in the printhead of Baughman et al to form the slot and remove the debris for the purpose of minimizing thermal damage and to achieve desired effects such as a particular via geometry.

Noted that the slot (18) of Baughman et al is formed by using two step processes to remove unused material from the substrate. However, a skilled artisan realizes that the number of removal processes are determined by the thickness and the material of the substrate or the size and shape of the slot so that it can provide a perfect slot. Thus, employing an optimum three different substrate removal processes as claimed is considered to be a matter of a mechanical design expedient for an engineer. Lacking of showing any criticality, one skilled in the art would be motivated to employ the optimum three step processes to form the slot of Baughman et al for the purpose of accommodating with thickness and material of a predetermined substrate.

### **Response to Applicant's Arguments**

The applicant argues that Boyle et al fails to suggest a first process and a second different process for removing additional substrate and debris. The argument is persuasive. However, this limitation is suggested by Magggs et al as stated above.

The applicant argues that Baughman fails to mention the debris. The argument is not persuasive because removing debris is an inherent step in a process of making a slot since drilling a hole on a substrate inherently produce debris. Moreover, removing debris is suggested by Maggs et al as stated above.

### **CONCLUSION**


**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

Art Unit: 2861

however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Anh Vo whose telephone number is (571) 272-2262. The examiner can normally be reached on Tuesday to Friday from 9:00 A.M. to 7:00 P.M.. The fax number of this Group 2861 is (571) 273-8300.



ANH T.N. VO  
PRIMARY EXAMINER  
July 13, 2006